



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

MICHAEL SHU-HUAN WANG ET AL.

Serial No. 10/718,921 (TI-34402)

Filed November 21, 2003

For: CHEMICAL MECHANICAL POLISHING APPARATUS AND METHOD TO
MINIMIZE SLURRY ACCUMULATION AND SCRATCH EXCURSIONS

Art Unit 3723

Examiner Shantese L. McDonald

Customer No. 23494

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Jay M. Cantor, Reg. No. 19,906

Sir:

BRIEF ON APPEAL

REAL PARTY IN INTEREST

The real party in interest is Texas Instruments Incorporated, a Delaware corporation with offices at 7839 Churchill Way, Dallas, Texas 75251.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals and/or interferences.

STATUS OF CLAIMS

This is an appeal of the rejection of claims 12 and 14 and objection to claim 13, all of the rejected claims. Claims 1 to 11 have been allowed and claim 15 has been canceled. Please charge
TI-34402-1

any costs to Deposit Account No. 20-0668 though it is noted that a Brief was previously filed and prosecution was reopened by the examiner in response thereto.

STATUS OF AMENDMENTS

An amendment was not filed after final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

As stated in the specification, it has been determined in accordance with the present invention that a problem exists in chemical-mechanical polishing of semiconductor wafers that there is a buildup of debris at the very center and at the axis of the cleaning pad, a region not washed or not completely washed by the prior art washing procedures. This problem, which has gone unrecognized, results in non-uniform polishing from wafer to wafer and can result in scratching of the wafer and other problems. These problems are alleviated by directing washing solution directly at the axis of the pad as well as the regions therearound when washing the pad between polishing cycles (interval from wafer to wafer).

The invention relates to an apparatus and method for cleaning a polishing pad of a chemical-mechanical polishing system and the appealed claims relate to the method only.

The invention according to claim 12 relates to a method for cleaning a polishing pad in a chemical mechanical polishing system and includes the steps of imparting relative motion to the polishing pad (page 6, line 12ff), wherein the polishing pad is rotated about a center axis which is perpendicular to the polishing surface of the polishing pad and dispensing a wash material directly to the most center portion of the polishing surface about and including the axis (page 8, line 1ff).

GROUND OF REJECTION

Claims 12 and 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng (U.S. 6,482,290) in view of Tolles (U.S. 6,702,651).

ARGUMENT

Claims 12 and 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng in view of Tolles. The rejection is without merit.

As stated above and in the specification, a principal feature of the present invention as defined in claim 12 is the recognition that the center or axial portion of the cleaning pad was not being adequately cleaned between processing cycles (from wafer to wafer), resulting in the problems listed in the specification at page 7, line 15ff. This problem is nowhere taught or even remotely suggested by Chang, Tolles or any proper combination of these references. This problem, which has gone unrecognized in the prior art, is alleviated by directing washing solution directly at the axis of the pad as well as the regions therearound. This is set forth in claim 12 by the language "dispensing a wash material directly to the most center portion of said polishing surface about and including said axis". Nothing in Cheng or Tolles teaches or suggests the problem or its solution.

As can be seen with reference to Figs. 5A to 5C of Cheng et al. and the associated text, the dispensing device operates in a half-circular path (column 7, line 23) and accordingly the dispensing device never provides the step quoted in the above paragraph. It follows that Cheng et al. fails to teach or suggest the invention as claimed.

In order for the arm 40 of Tolls to provide wash water to the axis of the pad, it would be necessary that the arm either extend beyond the center of the pad and have nozzles at the pad

center or have nozzles aimed at the pad center. Nothing of the sort is taught or suggested by Tolles. In fact, a review of column 8, lines 23ff and Fig. 6 of Tolles indicates that the slurry is delivered through tube 42 which appears to be directed at a central portion of the pad (not the axis and clearly not directed at or toward the axis. It follows that Tolles fails to teach or even suggest the feature noted above in claim 12 or the combination as claimed.

It follows that neither Cheng et al. or Tolles teaches or suggests the inventive feature and/or the inventive combination either alone or in any proper combination.

Claim 14 depends from claim 12 and therefore defines patentably over the applied references for at least the reasons presented above with reference to claim 12.

CONCLUSIONS

For the reasons stated above, reversal of the final rejection and allowance of the claims on appeal is requested that justice be done in the premises.

Respectfully submitted,



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CLAIMS APPENDIX

The claims on appeal read as follows:

12. A method for cleaning a polishing pad in a chemical mechanical polishing system, comprising the steps:

imparting relative motion to said polishing pad, wherein said polishing pad is rotated about a center axis which is perpendicular to the polishing surface of said polishing pad; and

dispensing a wash material directly to the most center portion of said polishing surface about and including said axis;

further comprising dispensing wash material from said dispensing arm to said polishing pad all along an area from the circumference of said polishing surface to said axis.

13. The method of Claim 12, further including providing a spray arm for dispensing said wash material and providing a spray extension which is coupled to a dispensing arm of said chemical mechanical polishing system for dispensing said wash material directly to the most center portion of said polishing surface about and including said axis.

14. The method of Claim 12, further comprising dispensing said de-ionized water solution directly to the most center portion of the polishing surface about said axis following polishing of a semiconductor wafer.

EVIDENCE APPENDIX

Not applicable

RELATED PROCEEDINGS APPENDIX

Not applicable